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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/780,745

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Peter Jaenecke

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EXAMINER

TIMORY, KABIR A

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

06/26/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/780,745

Applicant(s)

JAENECKE ET AL.

Examiner

Kabir A. Timory

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4 and 11-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 April 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This office action is in response to the amendment filed on April 20, 2007. Claims 1, 2, 4, and 11-15 are amended. Claims 1, 2, 4, and 11-15 are pending in this application and have been considered below. Claims 11-15 are added, and claims 3 and 5-10 are cancelled.

Drawing

2. The objection to figures 1-3 is corrected by the amendment; therefore, the objection is withdrawn.

Claim Objections

3. The objections to the claims 1-10 are corrected by the amendment; therefore, the objections are withdrawn.

Claim Rejections - 35 USC § 112

4. The rejection 35 U.S.C. 112, second paragraph, to the claim 2, as being indefinite for failing to particularly point out and distinctly claim the subject matter which application regards as the invention has been clarified by the amendment; therefore, the rejection under 35 U.S.C. 112, second paragraph is withdrawn.

Response to Arguments

Applicant arguments filed on 4/20/2007 have been fully considered but they are not persuasive. The examiner's response to applicant's arguments is as follows:

Applicant's Argument: In page 7, applicant suggests that "a position of a maximum and an amplitude at the maximum of the corresponding elementary functions"

The Examiner's Response: figure 1a and 1b illustrate an exemplary signal position with several signal with maximum peaks exceeding a specified threshold and the same signal after being subtracted and clipped to the a level equal to the specified threshold.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 2, and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Morris et al. (US Pub Number 2004/0203430).

Regarding claim 1:

As shown in figure 5b, Morris et al. discloses a method of reducing a peak-to-average power ratio of a signal to be transmitted, the method comprising:

- detecting a portion of the signal being above a clipping threshold level (figure 5b, 542, paragraph 0007, lines 1-6),
- decomposing the portion of the signal into a number of symmetric elementary functions, each with a single maximum, the number of functions being proportional to a duration of the portion of the signal (decomposing the portion of the signal is interpreted to be the Gaussian, Hanning, Hamming, Triangle, etc functions) (figure 1a, figure 4, Paragraph 0036, lines 10-13), and
- performing soft-clippings of the portion using a scaled reference function which is subtracted from each of the elementary functions into which the portion is decomposed and such that the subtracted elementary functions reduce a peak power of said portion of the signal to be transmitted (figure 1b, paragraph 0005, lines 1-9)
- wherein positions for subtracting the scaled reference function from each of the elementary functions and the scaling of the reference function are given respectively by a position of a maximum and an amplitude at the maximum of the corresponding elementary functions, such that the position of the maximum of each of the elementary functions and the corresponding amplitude at the maximum of each of the elementary functions provide locations and amplitudes for the soft-clipping of the portion of the signal (figure 1a and 1b illustrate an exemplary signal position with several signal with maximum peaks exceeding a specified threshold and the same

signal after being subtracted and clipped to the a level equal to the specified threshold) (figure 1a and 1b, paragraph 0007, lines 1-6).

Regarding claim 2:

Morris et al. further discloses, determining parameters for the elementary functions by determining an amplitude value and a position value for each of the functions (determining parameters is interpreted to be measuring an input signal, detecting a signal peak with a magnitude exceeding a specified threshold and magnitude is interpreted to be the amplitude) (Paragraph 0007, lines 1-6).

Regarding claim 12:

As shown in figure 5b, Morris et al. discloses an electronic circuit for reducing a peak-to-average power ratio of a signal to be transmitted, the electronic circuit comprising:

- a detector which detects a portion of the signal above a clipping threshold level figure 5b, 542, paragraph 0007, lines 1-6),
- a decomposing unit which decomposes the portion of the signal into a number of symmetric elementary functions each with a single maximum, wherein the number of elementary functions is proportional to a duration of the portion (decomposing the portion of the signal is interpreted to be the Gaussian, Hanning, Hamming, Triangle, etc functions) (figure 1a, figure 4, Paragraph 0036, lines 10-13),
- a soft-clipping unit (figure 7, 705) which performs soft-clipping of the portion using a scaled reference function which is subtracted from each of the elementary functions into which the portion is decomposed and such that the subtracted elementary

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functions reduce the peak power of the portion of the signal to be transmitted (paragraph 0020, lines 1-6), wherein the position for subtracting the scaled reference function from each of the elementary functions and the scaling of the reference function is given respectively by the position of the maximum and the amplitude at the maximum of the corresponding elementary function, such that the position of the maximum of each of the elementary functions and the corresponding amplitude at the maximum provide the locations (figure 1a and 1b illustrate an exemplary signal position with several signal with maximum peaks exceeding a specified threshold and the same signal after being subtracted clipped to the a level equal to the specified threshold) (figure 1a and 1b, paragraph 0007, lines 1-6) and

- the amplitudes for the soft-clipping of the portion of the signal above the clipping threshold level (figure 1a, and 1b).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4, 11, and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morris et al. (US Pub Number 2004/0203430) in view of Lipka et al. (US Pub. Number 2006/0029158).

Regarding claim 4:

Morris et al. discloses all of the subject matter as described above in claim 1 except for specifically teaching wherein the decomposing comprises by minimizing:

$$\sum_{i=1}^N (P - f(x_i, A_i))^2$$

or

$$\sum_{i=1}^N |P - f(x_i, A_i)|$$

where

N: is the number of functions f which is proportional to the duration of the peak P, xi: is the position of function f,

Ai: is the amplitude of function f

P: is the portion of the signal above clipping threshold level.

However, Lipka et al., in the same field of endeavor, teaches an analogous approach in deriving a similar equation to compute the peak power reduction (paragraph 0059 and 0060) as shown below:

$$s(t_p) = \sum_{k=0}^{k_{max}} c[k] \cdot h_e(t_p - kT_e)$$

and

$$\tilde{c}[k] = c_m[k] - \frac{h_e(t_p - kT_e)}{\sum_{k=0}^{k_{max}} h_e^2(t_p - kT_e)} \cdot \frac{|SMC(t_p)| - S_p}{|SMC(t_p)|} \cdot a_m \cdot s_m(t_p)$$

Where the first equation shows the peak reduction strategy for a single carrier and the second equation shows the strategy for multiple carriers. As shown in the above equations Lipka et al. is using these formulas for subtracting the peak power of a single and multiple carrier signal.

One of ordinary skill in the art would have clearly recognized that these two equations show a similar method of computing the peak power of a signal as the equation in claim 4. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the similar and related formula as taught by Lipka et al. to compute peak power reduction. In order to detect amplitude peaks and preventing any amplitude peaks from appearing in the processed output signal, the above formula can be used.

Regarding claim 11:

Morris et al. discloses all of the subject matter as described above in claim 1 except for specifically teaching a computer program product comprising computer program code means adapted to perform the method of claim t when the program is run on a computer.

However, Lipka et al., in the same field of endeavor, teaches a computer program product comprising computer program code means adapted to perform the method of claim t when the program is run on a computer (Paragraph 0023, lines 1-7).

One skilled in the art would have clearly recognized that the method of "peak power reduction" would have been implemented in software. The implemented software would perform same function of the hardware for less expense, adaptability, and flexibility. Therefore, it would have been obvious to one ordinary skilled in the art at the time of the invention was made to use the software as taught by Lipka et al., in the "peak power reduction" in order to reduce cost and improve the adaptability and flexibility of the communication system.

Regarding claim 13:

Morris et al. further discloses an end user telecommunication device for sending a signal, the end user telecommunication device comprising an electronic circuit in accordance with claim 11 (figure 5b, paragraph 0023, lines 1-5, and lines 20-26).

One of ordinary skilled in the art would have clearly recognized that wireless communication network such CDMA, GSM, WCDMA, UMTS and ones based on OFDM consists of base station, core network, mobile device or end user device.

To reduce the peak average power ratio is a system, it would have been obvious to one ordinary skill in the art at the time the invention was made to use add the power reduction circuitry in the user device as taught by Morris et al. in peak power reduction using windowing and filtering system.

Regarding claim 14:

Morris et al. further discloses a telecommunication system having at least one base station comprising an electronic circuit in accordance with claim 11 (figure 5b, paragraph 0023, lines 1-5, and lines 20-26).

One of ordinary skilled in the art would have clearly recognized that wireless communication network such CDMA, GSM, WCDMA, UMTS and ones based on OFDM consists of base station, core network, mobile device or end user device.

To reduce the peak average power ratio is a system, it would have been obvious to one ordinary skill in the art at the time the invention was made to use add the power reduction circuitry in the base station as taught by Morris et al. in peak power reduction using windowing and filtering system.

Regarding claim 15:

Morris et al. further discloses a transmitter comprising:

- means for multi-carrier synthesis to provide a multi-carrier multiplexed signal to be transmitted (OFDM "Orthogonal Frequency Division Multiplexing" is interpreted to be a multi-carrier synthesis) (Paragraph 0023, lines 21-26), and
- means for reducing a peak-to-average power ratio of the signal comprising an electronic circuit in accordance with claim 11 (figure 5b, paragraph 0001, lines 1-3).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kabir A. Timory whose telephone number is 571-270-1674. The examiner can normally be reached on 6:30 AM - 3:00 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kabir A. Timory
June 15, 2007


DAVID C. PAYNE
SUPERVISORY PATENT EXAMINER